New CERES Scan Patterns for Enhanced Coverage of Field Campaigns

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CERES Science Team Meeting

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Objectives

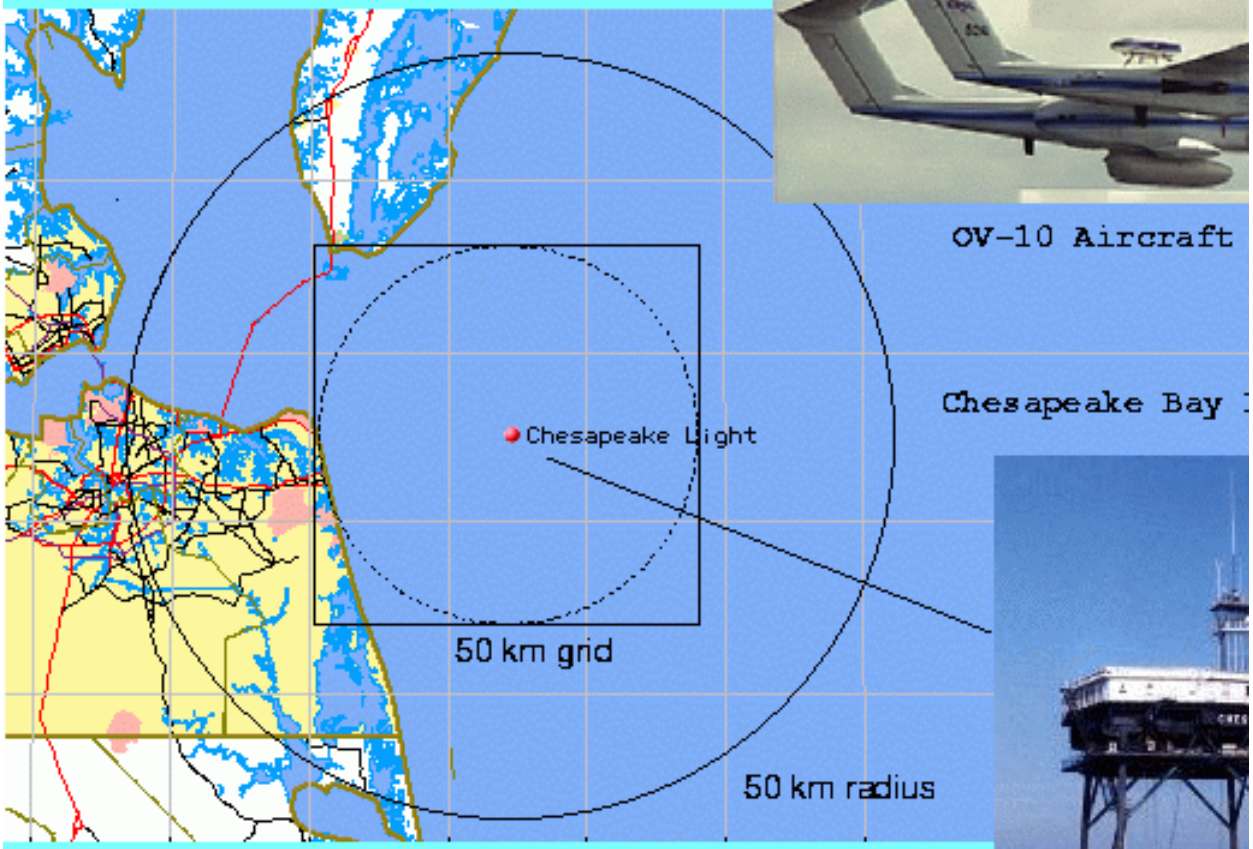
- Get 10 times more spatial coverage than from cross-track scans at every satellite overpass
- Provide better satellite coverage of field campaigns to benefit validation activities
- Observe the target area with a large range of viewing and relative azimuth angles at every satellite overpass

Method

- Define target location and date of observation
- Get orbital prediction of sub-satellite location
- Find time when satellite is close to target
- Define time step (stationary CERES azimuth)
- Compute CERES azimuth angles required to keep target in CERES scan as satellite moves across target area
- Produce command file for CERES upload

Chesapeake Lighthouse & Aircraft Measurements for Satellites (CLAMS)
Jul 10 – Aug 2, 2001

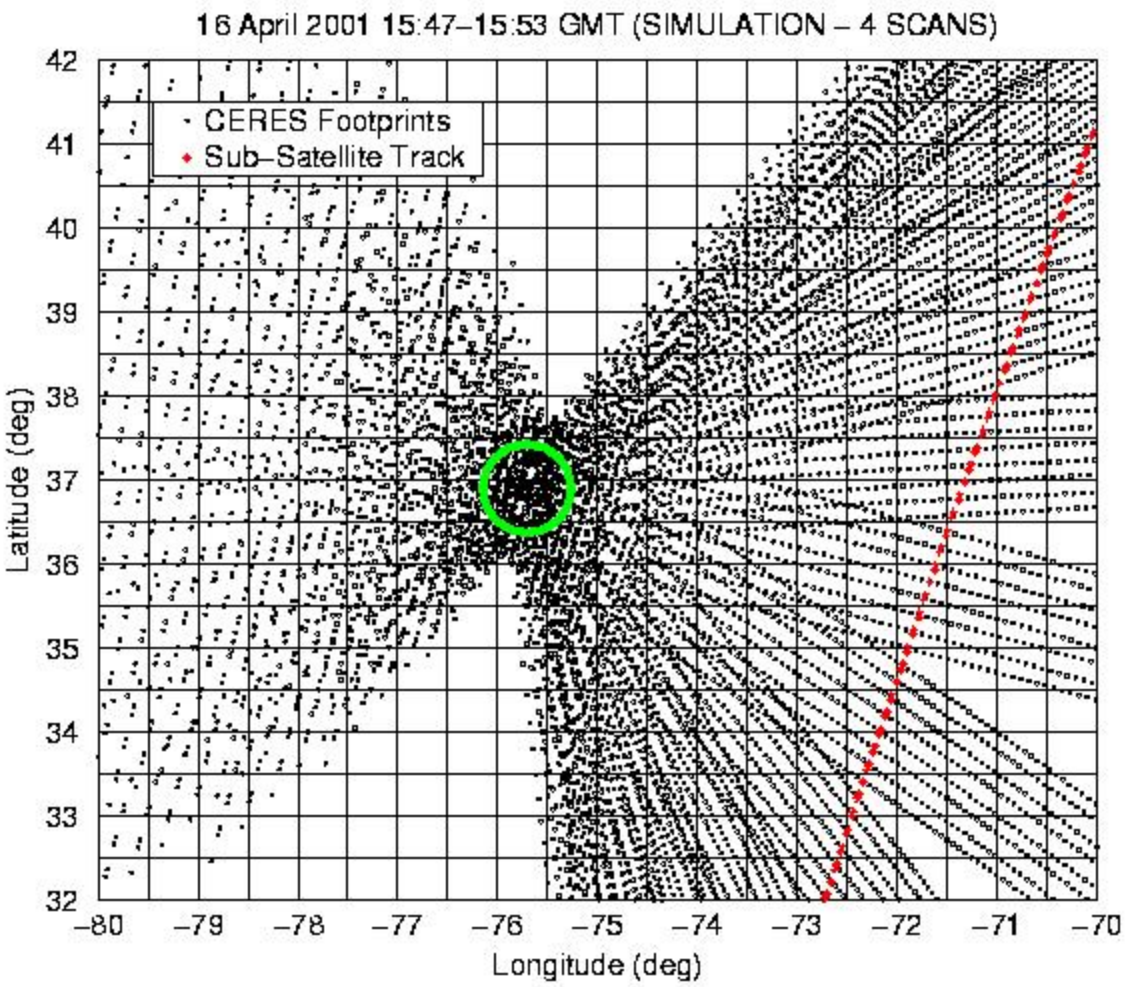
OV-10 Aircraft



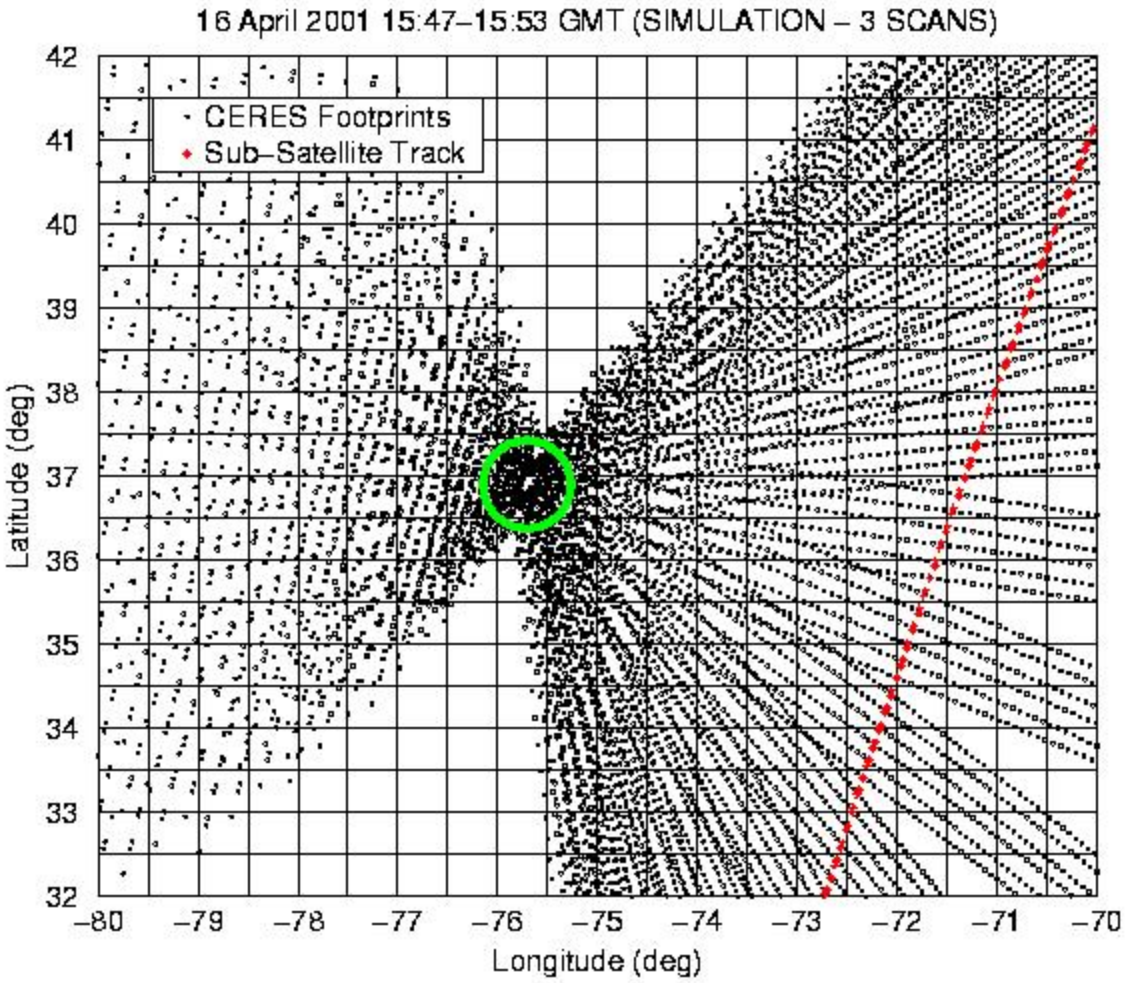
Chesapeake Bay

Combining Long Term Ocean Spectral Surface Observations With Satellite & Aircraft Measurements To Enhance Our Knowledge of Oceans Surface Reflectences & Aerosols

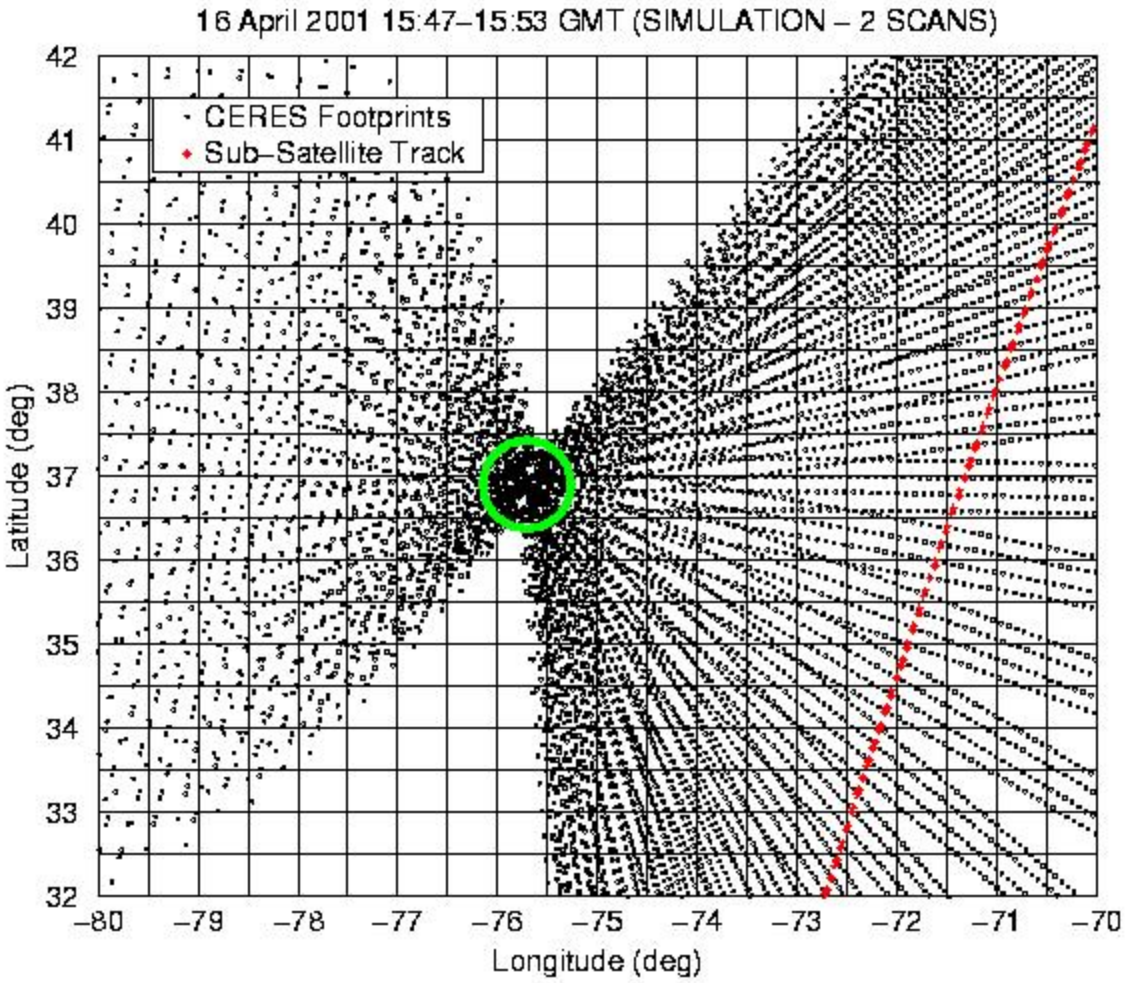
Chesapeake Lighthouse from CERES/TERRA

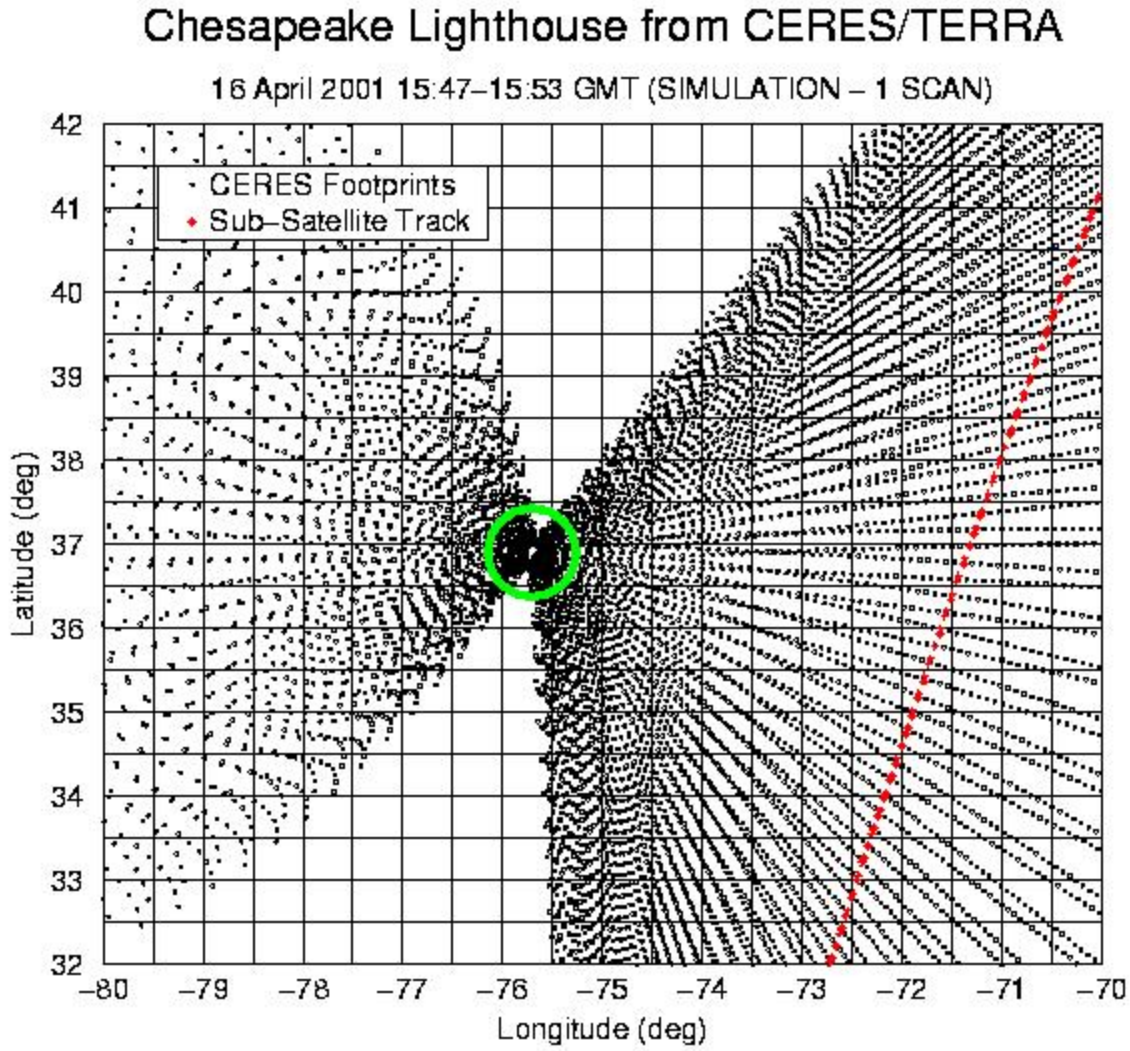


Chesapeake Lighthouse from CERES/TERRA



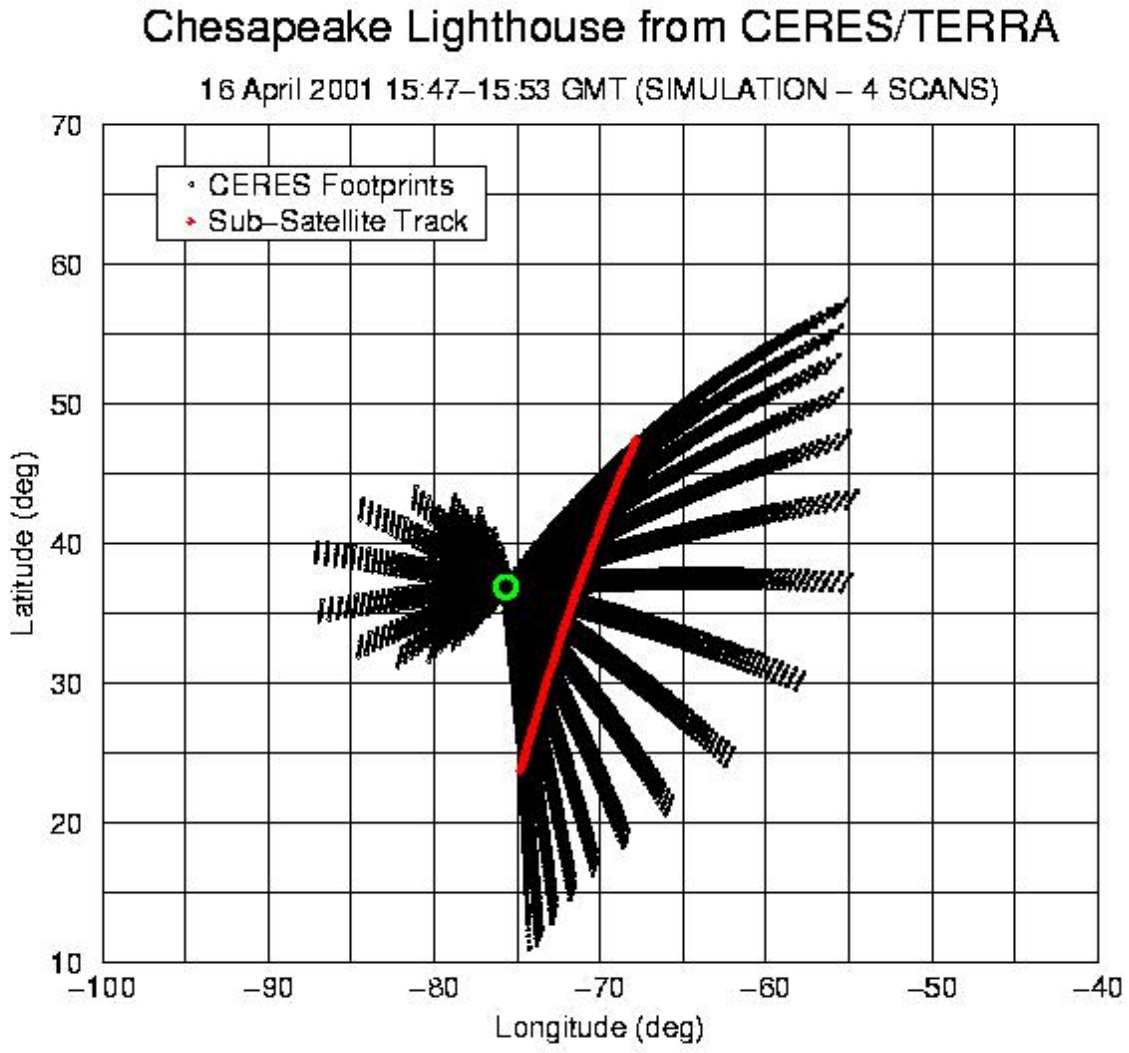
Chesapeake Lighthouse from CERES/TERRA




Chesapeake Lighthouse from CERES/TERRA
16 April 2001 15:47–15:53 GMT (SIMULATION – 1 SCAN)
CERES Footprints
Sub–Satellite Track
Latitude (deg)
Longitude (deg)
42
41
40
39
38
37
36
35
34
33
32
–80
–79
–78
–77
–76
–75
–74
–73
–72
–71
–70

Number of Footprints in Target Area

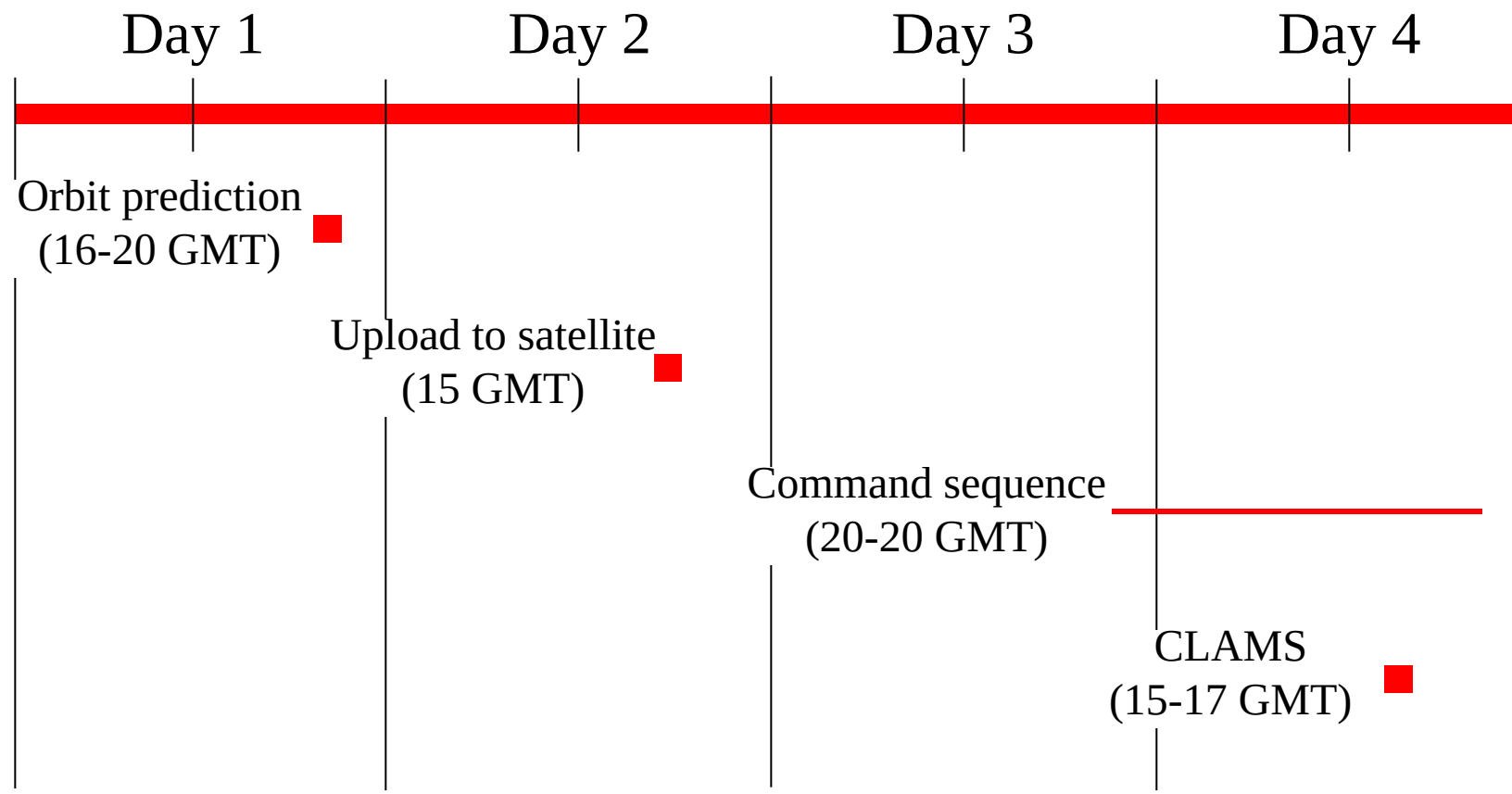
	10-km radius	50-km radius
Cross-Track	2	35
4 scans	25 (13:1)	463 (13:1)
3 scans	18 (9:1)	523 (15:1)
2 scans	57 (28:1)	596 (17:1)
1 scan	43 (22:1)	628 (18:1)


Chesapeake Lighthouse from CERES/TERRA
16 April 2001 15:47–15:53 GMT (SIMULATION – 4 SCANS)
CERES Footprints
Sub–Satellite Track
70
60
50
40
30
20
10
Latitude (deg)
–100
–90
–80
–70
–60
–50
–40
Longitude (deg)

Command File for CERES Upload

Date	hh:mm:dd	Orbit	Azimuth
2001106	154700	7067	110.7
2001106	154726	7067	113.5
2001106	154752	7067	117.4
2001106	154819	7067	122.9
2001106	154845	7067	131.2
2001106	154912	7067	144.5
2001106	154938	7067	165.1
2001106	155004	7067	191.5
2001106	155031	7067	215
2001106	155057	7067	230.7
2001106	155124	7067	240.6
2001106	155150	7067	247
2001106	155216	7067	251.4
2001106	155243	7067	254.5
2001106	155309	7067	256.9

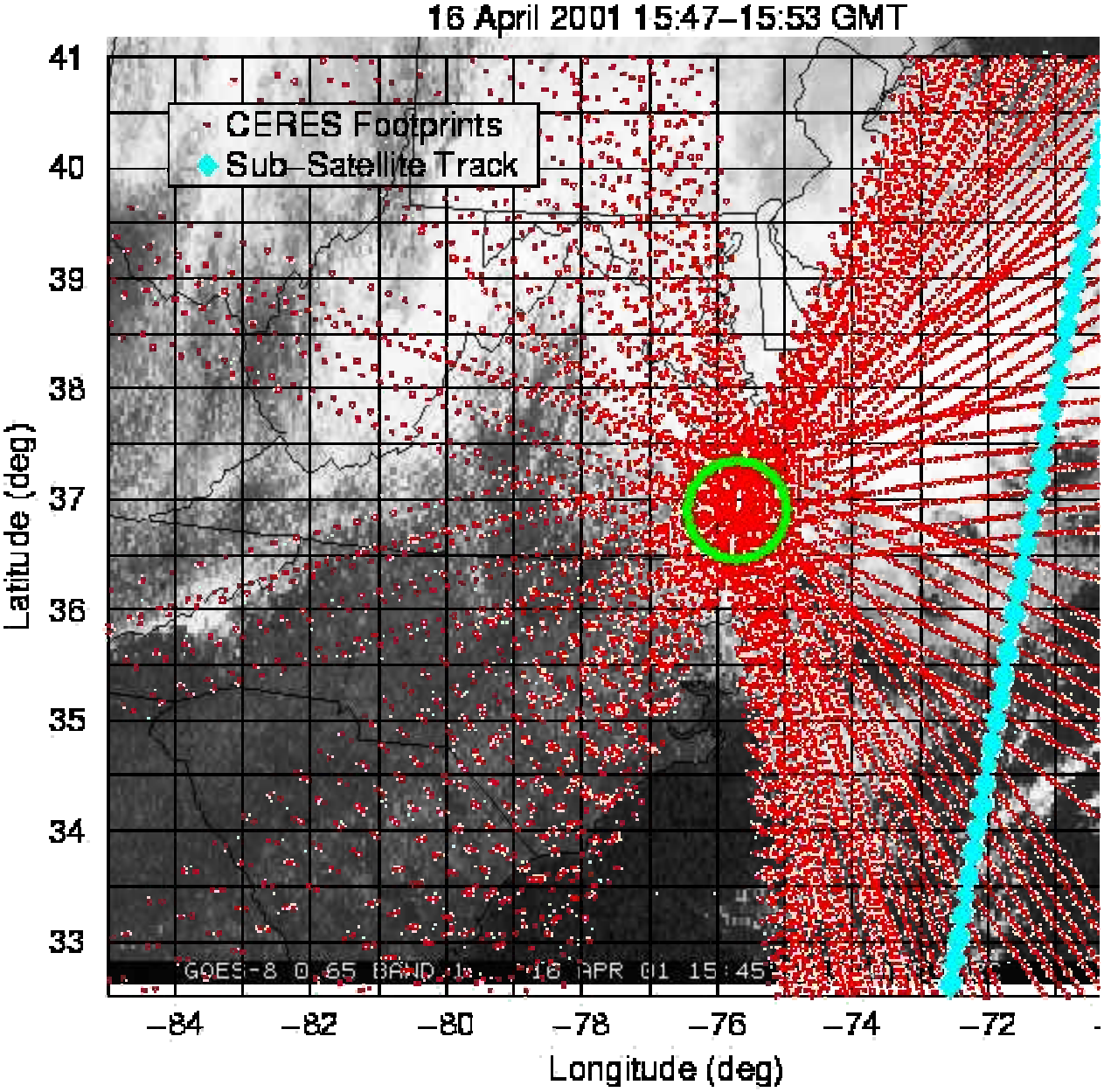
Schedule


Day 1
Day 2
Day 3
Day 4
Orbit prediction
(16-20 GMT)
Upload to satellite
(15 GMT)
Command sequence
(20-20 GMT)
CLAMS
(15-17 GMT)

Predicted CERES Azimuth Test

- Orbital predictions from 12 April 2001
- 15 azimuth rotations (every 4 scans)
- Test performed on 16 April 2001
- BDS data: half orbit
- BDS data: CLAMS area

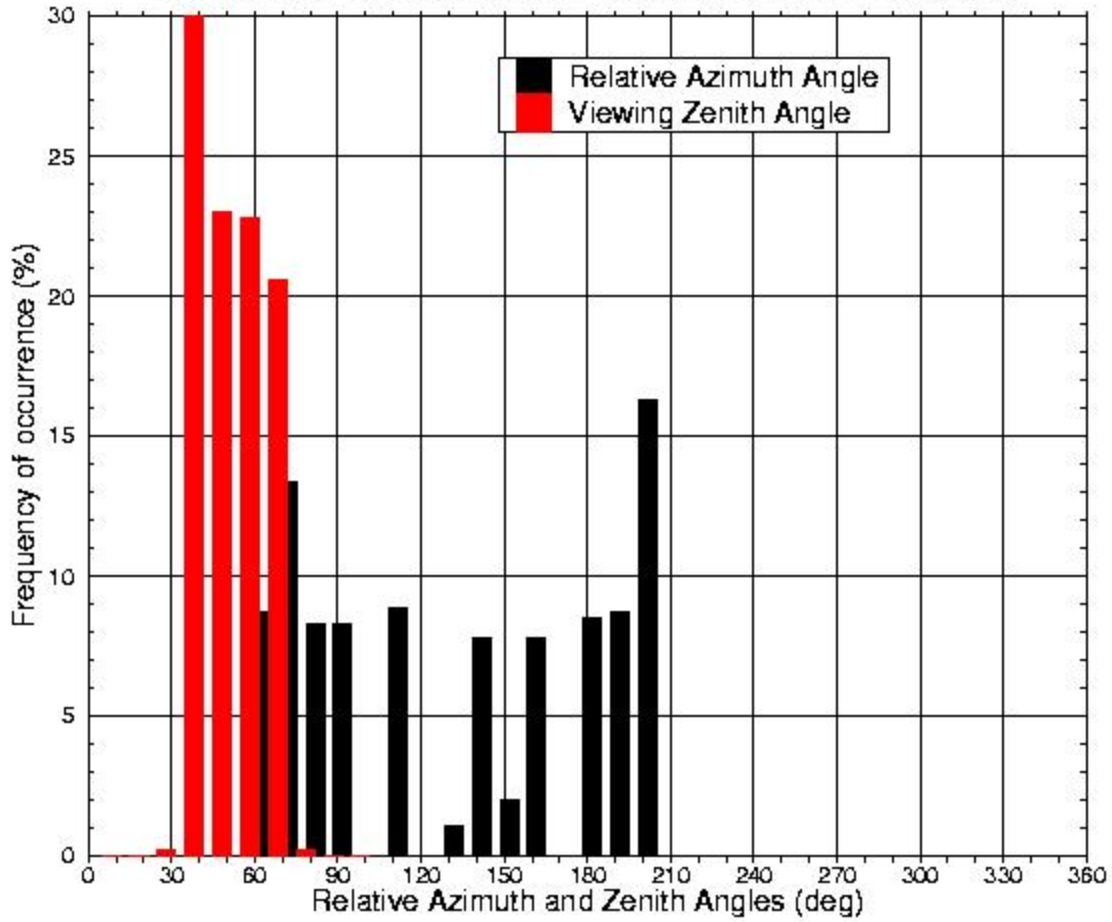
Chesapeake Lighthouse from CERES/TEF



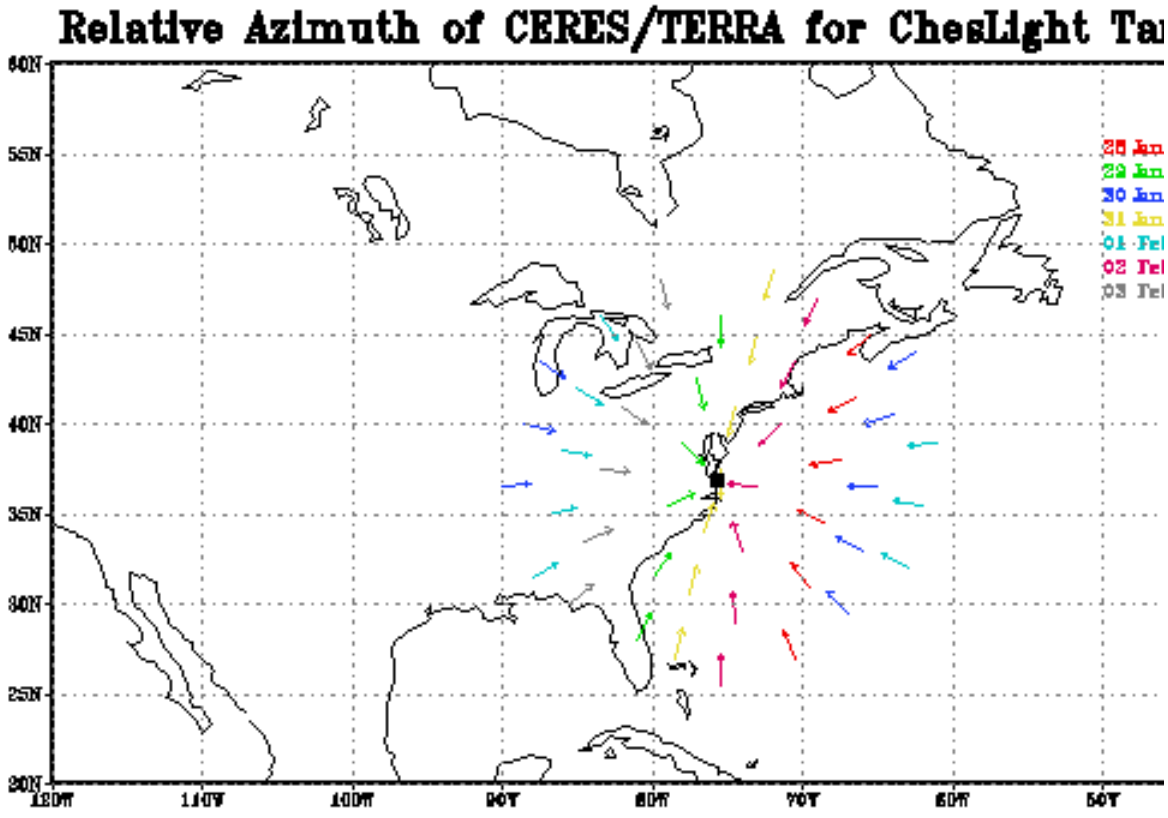
Number of Footprints in 100-km CLAMS Area

	10-km radius	50-km radius
Simulated data	25 (12:1)	463 (13:1)
BDS data	19 (10:1)	447 (13:1)
BDS data Cross-Track	2	35

Viewing and Relative Azimuth Angles in 100-km CLAMS Area



One Week of Azimuth Predictions



Future Work

- Perform additional predicted azimuth tests
- CLAMS July 10 – Aug 2, 2001: operate RAPS instrument at predicted azimuth over target area
- Predicted azimuth scan pattern can be used
  - To cover any field experiment
  - To validate angular models
  - To perform inter-calibration with GERB

CERES/GERB Relative Azimuth